

## SOMETHING EDISON HAS NEVER LEARNED

Transmission of Cable Messages  
Across the Atlantic.

WORDS WRITTEN BY WAVE LINES.

How the Work is Done—Chat About the Men.  
Wonderful Skill in Sending and Receiving  
Dispatches—Locating a Break in the Line.  
How Repairs are Made to the Cables.

Thomas A. Edison, who in his time has been one of the fastest telegraphers in the world, admits that he is totally unable to receive a cable message from across the Atlantic ocean. "While the ordinary Morse land dispatch is represented by makes and breaks of the current," he said, recently, "the cable message is represented by a waving line. This line runs up and down unequally. It is the length or value of the curves that enables the operator to detect the message. I have often

rent when it is acting under long distances of water. Electricity invariably seeks to escape from its conductor to the earth. Mother Earth will, in fact, absorb it all if given the chance. The cable is, therefore, insulated, but this desire to return to earth is stronger than the resisting power of the insulation; therefore, while the latter holds the current partially intact, the gutta percha or other covering of the cable is filled with innumerable stray lateral currents all seeking to escape to the surrounding water.

With such a state of affairs it would be simply impossible to operate a succession of makes and breaks in the current; the residual would, if short, fill up the gaps. The difficulty is overcome by operating two keys on the sounder instead of one, as in ordinary telegraphy. One key is attached to the positive pole of the battery; the other key is attached to the negative pole. Thus by depressing either key an impulse is created in different directions over the line. As a short cut to brevity it may change constantly and the current travels in either direction, backward or forward, at the will of the operator. This is reduced to a practical basis in an ingenious manner.

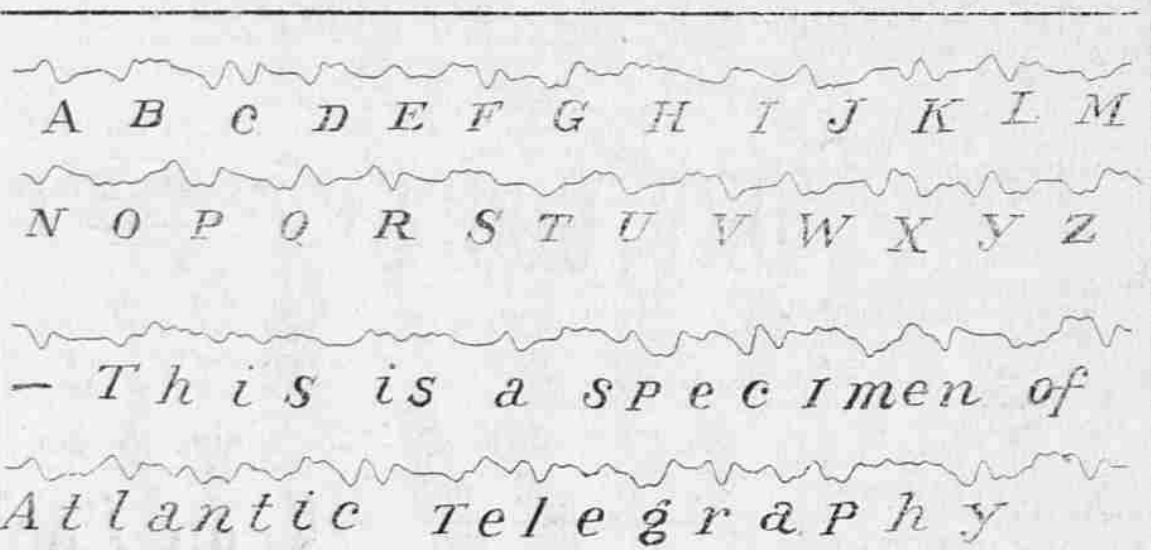
On the receiver's desk in the cable station will be found a large double magnet. Suspended between the poles of this magnet is a small elongated coil of wire. The coil hangs suspended in the air by means of a delicate fibrous thread. The current from the cable is made to pass around the coil, which, as it is hanging between the poles of the magnet, will turn backward or forward in response to the particular key depressed by the operator at the other end of the line; for it

a fact nevertheless that it is done, and many strange friendships are formed between men who have never seen each other and who may never have been ten miles away from their apart. There is an old story of a man who refused to believe in a telegram sent to a friend because it "was not his handwriting." This could not apply to cable operators.

As soon as the siphon begins to make its way line on the tape, the operator, or rather the recorder of the same, knows who is at the other end of the wire. The "writing" of different operators is as recognizable at a distance of 3,000 miles as it would be if they were nearer at hand. The peculiarities of the man are detected on the tape, and without any attempt at slang a man is known by his curves. Some operators "write a plain hand," others send a message that is equivalent to what in ordinary life would be called very bad manuscript. If an operator gets into a rage and violently bangs his keys the fact is known to the men at the other end of the line, and he is prudently laughed at, in another hemisphere. In the old days, long distance fights used often to occur, but talk on any private matter between operators is now strictly prohibited by the various cable companies.

### • HOW A BREAK IS LOCATED.

Sometimes a cable will break at the bottom of the sea, or some other fault will prevent messages being sent through. Although the line extends through miles of drift and over leagues of ocean bed, the system has been reduced to such a nicety that the location of the fault is only a matter of lit-



CABLE ALPHABET AND SPECIMEN OF ATLANTIC TELEGRAPHY.

watched the operators at work, and I think it is wonderful that they are able to select the message at all. The line as it runs up and down is crossed and recrossed by other lines coming from earth currents and the thousands and one sources from which a stray current gets in. It is simply impossible for me to pick out the real message. Yet those fellows do it every time and with comparative ease."

### IT DIFFERS FROM ORDINARY TELEGRAPHY.

Now, not only is this complimentary to the skill of the cable operators, but it calls attention to a department of the public service and a class of workers of which most persons know little or nothing says the Washington Star. The cable station is after all the most wonderful institution in the whole telegraphic system. The method of its operation is totally different from that of the land telegraph office. The quantities are less exact; a greater mental force is required of the operator. Moreover, the mechanism of the system is more picturesque.

There is more human interest in transmitting characters 3,000 miles under the sea and eventually setting them down in black and white than there is in clicking a series of dots and dashes over a land wire. For this is what cabling across the ocean amounts to. When the operator in the New York cable station gives an impulse to this key, he knows that he is practically writing with an elongated pen which reaches out undisturbed through miles of alternate tempest and calm and sets down on a strip of paper letters and words which have all the peculiarities of his own chirography. Nor is this at all overdrawn. Operators at each end of the line recognize each other by the characteristic shapes of the curved lines which they cause to be traced on the long strips of paper at the receiver's desk.

It is common event nowadays for arbitrage brokers on the New York cotton exchange to send a cablegram to the Liverpool cotton exchange ordering a sale of "future" cotton, have the sale made and receive a receipt announcing the conclusion of the transaction in two minutes from the time the first message was handed to the clerk. The significance of this will be realized when it is pointed out that there is a class of brokers who depend for business solely on the half minute or so of telegraphic time which exists between here and Europe. If cotton is quoted at the same price on the New York and Liverpool or other exchanges, but should subsequently drop half a point, arbitrage brokers with connections abroad are sure to cable their agents to sell out before the official change in the quotation is sent across the sea. The aim is to save the difference in price between the two quotations.

Many brokers make all their profits in this way, and the tendency of it has been to quicken the business methods of the exchanges. So much has this become the fact that a delay of one-half minute in the sending of a cablegram is sure to cause loud and threatening protest from the brokers. One firm, in fact, instituted a suit for damages against a leading cable company because of a delay of ten minutes in sending; suit was eventually withdrawn but the incident serves to show at what a break-neck pace business is now done in our exchanges—quite a contrast to the relays of couriers which were used to carry the news of the battle of Waterloo to Rothschilds.

### DESCRIPTION OF APPARATUS.

The reason a waving line printed on a strip of paper is used in cabling instead of the Morse code of dots and dashes is because of the peculiar construction of the cable itself and of a certain eccentricity of the electric cur-

rent when it is acting under long distances of water. Electricity invariably seeks to escape from its conductor to the earth. Mother Earth will, in fact, absorb it all if given the chance. The cable is, therefore, insulated, but this desire to return to earth is stronger than the resisting power of the insulation; therefore, while the latter holds the current partially intact, the gutta percha or other covering of the cable is filled with innumerable stray lateral currents all seeking to escape to the surrounding water.

### PRODUCING THE WAVING LINE.

Connected to one end of the coil of wire is another lead of fibrous material. This thread runs to a fine glass tube, which is not larger than one-hundredth of an inch in diameter. Ink flows through this small tube. As the tube is movable it is obvious that the action of the coil of wire moving backward and forward will also cause the ink tube to move backward and forward. At least the coil pulls the tube in one direction and a small spring returns it to its place. The end of the tube rests lightly on a long strip of paper, which is kept moving along constantly by an ordinary clockwork mechanism. Thus it will be seen that the depression of the transmitting keys results in a waving line on paper at the other end of the cable system.

The ink tube or siphon is so small that great difficulty is experienced in including the ink to flow from it. The desired object is finally gained by means of electricity. A static current is sent through the ink in the tube and made to pass through the strip of paper to the negative pole of the battery beneath. Static electricity, as it has a great electromotive force, will easily pass through paper, therefore there is a continual succession of sparks flowing through and carrying the small column of ink along with it as far as the surface of the paper where it is deposited in a waving line. This is the line which Edison cannot read, but which is as plain as day to the ordinary cable operators. The latter sit and watch this tape all day long. It travels slowly in front of them a distance of three feet or more before it runs off the end of the table into a basket. The words are generally unintelligible to the operator, for it is seldom that other than cipher dispatches are sent over the wire.

When no current or message is passing, the sensitive coil of wire attached to the siphon remains at rest and a straight line is traced down the center of the paper; for, of course, the tape keeps moving along constantly, message or not. This line is known as the zero line and all variations from it determine what the man at the other end of the line is saying. Sometimes, however, earth currents leak through to the core of the cable and send the siphon careening backward and forward in an alarming manner. Then if a message comes through at the same time the wild actions of the siphon become unintelligible indeed. In such a case the operator is compelled to study the form of the line made by the earth current and then to note the difference between it and the true message. In short, he makes his earth current line his zero mark and determines his message accordingly.

It is in this connection that we must look for the true reason why we are unable to telephone across the Atlantic. It is this electrification of the gutta percha that prevents it. There is no real insulating substance. Some substances insulate more than others, but all are subject to electrification. When an electric impulse is sent across the ocean the whole of the cable, covering and all, must be electrified before the current flows through and operates the receiving device. It is what is known as the tail end of the charge that really carries the message. This interferes with the sound wave. In telegraphing there are only ten or twelve sound waves a second. In telephoning there are two or three thousand in the same time. It is obviously impossible then to telephone across the sea under existing circumstances.

One of the peculiar phenomena of cabling is the ability of one operator to recognize the "handwriting" of the operator at the other end of the line, far away in England or France. It is

the peculiarity of an electrified coil of wire to so act when suspended between magnetic poles.

tie calculation. It is generally located as follows. It is known that the resistance which the wire offers to the current averages a specified quantity to the mile. When a break or a fault occurs the resistance of a cable is measured in the cable station. This can be readily done, because the circuit will generally complete itself through the earth. When the resistance has been measured, it is easy to find out where the break is by dividing the whole amount by the average resistance per mile. It may then be found that the break is two, three, four or five hundred miles off shore, as the case may happen to be. A cable-repairing steamer, with a full complement of electricians on board, immediately starts for the spot where the break is supposed to be. This is an easy matter, for when cables are laid the latitude and longitude of the cable-laying ship is taken as each mile of the cable is paid out. If the break, as determined by the resistance, is, say, 500 miles off shore the captain of the repair boat directs his vessel to the particular junction of latitude and longitude which was encountered when the 500-mile mark of the cable was first laid. Having arrived at what he conceives to be the proper vicinity, he steers his vessel into a course at right angles to the course held by the cable. He then throws an iron overboard and proceeds to grapple for the cable.

### DIFFERENCE IN THE PULL.

He knows when he has caught the cable by the difference in the pull from the pull which is felt when a rock is truck. A rock when caught by the cable will finally let go with a jerk, but the cable when caught will exert a long, steady and obstinate pull as it is hauled to the surface. There is also a patent grapping iron which cuts through the cable covering and electrically rings a bell. Having picked up the cable, the chief electrician on board the boat cuts through the covering. If it has not already been cut through by the grapping iron, and, attaching a transmitter to the core, sends a signal through the cable. If he gets an answer from this end of the line he knows of course that the break must be beyond him, or vice versa, if the answer comes from the European end. As he now knows in which direction from the vessel the break must be, he proceeds to measure the resistance of the "broken" end, in order to see exactly what its distance is from the vessel.

If it is not far, say, four or five miles, the captain of the vessel proceeds to underpin the cable until the delinquent spot is reached, when it is an easy matter to repair the break or to put in a new section of cable. If the break is found to be a number of miles away, the part which has been picked up is attached to a buoy, and the vessel steams away to what further observation has determined to be the required spot. The cable is picked up again and a signal is sent through.

If the answer is from Europe instead of from this end of the line, it follows that the break must be somewhere between the parts of the cable which have been picked up. The precise spot can then be easily determined and repairs can be made. Sometimes the work is very expeditious, but in stormy seasons of the year it has often been a month before the break has been found. It has also happened that in grappling for a cable the repair boat has picked up by mistake the cable of another company. This has happened three or four times, but the courtesy of the cable companies to each other has always excused it.

The British aristocracy includes 14,000 persons.

## MEMORY OF LATE JUDGE S. L. AUSTIN

Resolutions Presented by Members of Bar Yesterday.

RESPECT FOR LATE MR. NAWAHI.

The Deceased Barrister and Jurist Eulogized by Judges and Attorneys—Their Worth as Citizens and Professional Men—Resolutions Placed Upon the Records of the Court.

The Supreme Court and Bar Association met in joint session at 10 o'clock yesterday in taking official action upon the death of Judge S. L. Austin of Hawaii and J. K. Nawahi of Honolulu.

At the meeting of the Bar Association held on Saturday, committees were appointed to draft suitable resolutions, and these were presented at the meeting yesterday. Gardner K. Wilder, the chairman of the Austin committee, presented the following:

"Whereas, It has pleased Almighty God to take from among us the Honorable Stafford L. Austin, Judge of the Circuit Court for the Third and Fourth Judicial Circuits; be it

"Resolved, That in the death of Judge Austin the community has lost an honored citizen and the judiciary of the Republic a conscientious, humane and fearless judge.

"Resolved, That we sincerely mourn his loss, and that we extend to his family our sympathy in their bereavement.

"Resolved, That we move that these resolutions be spread upon the records of this court.

GARDNER K. WILDER,  
E. P. DOLE,  
J. MAHAIAI KANEKAU,  
Committee."

Attorney General Smith seconded the resolutions in a few remarks commendatory of the deceased.

James K. Kaulia, chairman of the Nawahi committee offered the following:

"Whereas, It has pleased the Almighty to remove from our midst the Honorable J. K. Nawahi, a member of the Hawaiian Bar;

"Resolved, That in the death of Mr. Nawahi the Bar and Hawaii nei has lost one of its most esteemed members and truest friends.

"Resolved, That we hereby express to the family of the deceased our sincere sympathy in their sorrow.

"Resolved, That the court be requested to spread these resolutions upon its records.

JAMES K. KAULIA,  
W. S. EDINGS,  
ENOCH JOHNSON,  
Committee."

These were also seconded by the Attorney General and remarks followed by Chief Justice Judd and members of the bar.

### CABLES OF THE WORLD.

No Atlantic cable runs directly to New York City at the present time. Most of the trans-Atlantic lines land in the neighborhood of Nova Scotia or Newfoundland. The messages are retransmitted by a coast line to the metropolis. The interval of time required in the retransmission is not one second, for the operators read the messages faster by letter as they arrive and send them over the coast cables instantly. The new French cable to be laid next year will, however, have its terminus directly in New York City. It is expected that the competition thus engendered will greatly enhance the general service. The coming congressional agitation over the installation of a Pacific cable will also revive interest in a scheme which must quicken the general process of civilization. The Japanese commercial awakening will certainly receive a further impetus when this cable is laid. The whole East, in fact, will be benefited, and incidentally our foreign commerce. Already there are over 1,000 cables lying under the sea and the various water courses of the world. They aggregate over one and a quarter million miles of cable line. A large fleet of steamers and an army of men are kept busy laying and repairing them, so that altogether the cable industry is a large business in itself, even aside from the messages which are sent over the cable wires.

The W. G. Hall leaves on her regular route this morning at 10 o'clock.

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To introduce to you our immense facilities we will send free of charge to you or any other foreign resident our "Buyers' Guide," a 25-cent book, 700 pages, 15,000 illustrations, 4,000 descriptions— invaluable in ordering—and our "Hand Book for Foreign Buyers," which gives all information necessary to put you in touch with our methods. Send us your address and we'll do the rest.

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### PRESENTATION TO BISHOP.

May at St. Louis College and a Watch and Chain Presented.

The pupils and friends of St. Louis College met Saturday night at the music hall and presented for the entertainment of Bishop Roper the drama—The Proscribed Heir. Before the performance began the college orchestra rendered some delightful music.

During an interval the bishop was presented with a handsome gold watch and chain appropriately engraved and with the photograph of the Bishop on dial. This was in appreciation of the kindness of the venerable prelate in providing the students and scholars with an amusement hall and theatre.

Those who believe chronic diarrhoea to be incurable should read what Mr. P. E. Grisham, of Gaars Mills, La., has to say on the subject viz.: "I have been a sufferer from chronic diarrhoea ever since the war and have tried all kinds of medicines for it. At last I found a remedy that effected a cure and that was Chamberlain's Colic, Cholera and Diarrhoea Remedy. This medicine can always be depended upon for colic, cholera morbus, dysentery and diarrhoea. It is pleasant to take and never fails to effect a cure. 25 and 50 cent sizes for sale by all druggists and dealers. Benson, Smith & Co., agents for the Hawaiian Islands.

Commissioner Marsden visited Waianae yesterday to investigate the coffee plantations. He found the trees flourishing and promising a good crop. He will visit Maunawili, where it is said the beetles have destroyed the Librarian coffee, tomorrow.

## Bad Men

Cannot steal your door mats if you use our Hartman Steel Wire Mats. They never wear out, and are handy to have in the house, especially in rainy weather; which last remark reminds us that we have a line of Rain Gauges which will be of service to you at this time of the year.

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Perhaps you do and don't know it. You see it's sometimes made into croquettes. We handle a splendid Meat and Vegetable Chopper, which operates by a crank and walking-beam attachment, the knives chopping and revolving the food so as to mince it properly.

You can own a Shoe Stand without being a bootblack. We have a serviceable, useful article that screws to the wall and has compartments for brushes and blacking, with foot-rest projection.

Does your daughter like pets? Yes! Then she undoubtedly would prefer a canary, in one of our Brass Bird Cages, to reed birds on a chafing dish. We have three sizes of cages, and sell them from \$2.50 to \$4.50, as well as painted wire cages from \$1.25 to \$2. Get one, and your canary will say the same as we do, that they are "Cheap!" "Cheap!"

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## E. O. HALL & SON,

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## New Goods

Among them you will find:

CUT AND GALVANIZED NAILS and SPIKES, WIRE NAILS, COPPER RIVETS and BURS, HAY CUTTERS, HAY FORKS, CYLINDER CHURNS, SHOVELS and SPADES, CAST STEEL, BAR IRON, GALV'D SHEET IRON, GALV'D BUCKETS and TUBS, CART AXLES, DOOR LOCKS, HANDLED AXES and HATCHETS, IRON and BRASS SCREWS (2000 gross, assorted), COFFEE MILLS, CORN MILLS, BLACK RIVETS, HINGES, LAWN MOWERS, HORSE SHOES and HORSE NAILS, MOPS, BROOMS, PADLOCKS, CROW-BARS, CARRIAGE SPRINGS, SCALES, SAND PAPER, WRAPPING PAPER, WHEEL BARROWS, TRUCKS, 3000 YDS. SAIL DUCK, IRON WASHERS, IRON NUTS, CASES BENZINE, TURPENTINE, GALV'D PIPE, 1/2 in. to 2 in., MANILA and SISAL ROPE—All sizes, IRON and STEEL WIRE ROPE, up to 2 in., 2000 lbs. COTTON FISH LINES, CARD MATCHES, BLOCK MATCHES

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